DOCUMENT RESUME

ED 474 287 CE 084 676

TITLE	Learning Organization. Symposium.
REPORT NO	No-34
PUB DATE	2002-00-00
NOTE	24p.; In: Academy of Human Resource Development (AHRD) Conference Proceedings (Honolulu, Hawaii, February 27-March 3, 2002); see CE 084 635. Some figures in Westbrook and Veale paper are not available.
PUB TYPE	Reports - Evaluative (142) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	Academic Achievement; Administrator Behavior; Developing Nations; Educational Background; *Employee Attitudes; Foreign Countries; Job Skills; *Knowledge Level; Labor Force Development; Occupations; *Organizational Change; Organizational Development; Organizational Effectiveness; Predictive Validity; Problem Solving; Psychometrics; Skill Development; *Test Construction; Test Reliability; *Transformational Leadership
IDENTIFIERS	Iowa; *Learning Organizations; *Taiwan; Work Based Learning

ABSTRACT

This symposium on the learning organization is comprised of three papers. "Leading the Learning Organization" (James R. Johnson) examines actions that four leaders of widely diverse organizations took to transform an organization into a learning organization. (Leaders who were successful in implementing the learning organization concept used it as the solution to a business problem, while devoting time and attention to the transformation.) "An Examination of Psychometric Properties of Chinese Version of the Dimensions of Learning Organization Questionnaire (DLOQ) in Taiwanese Context" (Bella Ya-Hui Lien et al.) reports that the analyses revealed the Chinese version demonstrated reasonable reliability estimates; the seven-dimension factor structure was stable in Taiwanese contexts; and the evidence of predictive validity was obtained as the seven dimensions of learning could successfully predict types of organization and had statistically significant correlation with perceptual measures of organizational performance. "Our Two-Tiered Learning Organizations: Investigating the Knowledge Divide in Work-Related Learning" (Thomas S. Westbrook, James R. Veale) focuses on research to examine whether evidence of a knowledge divide existed in the self-reported work-related learning patterns and attitudes of 1,031 working adults in Iowa. (Results support the exist of knowledge divide related to the adult's education level and occupation category.) All papers have substantial bibliographies. (YLB)

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ED 474 287

2002 AHRD Conference

Learning Organization

Symposium 34

Honolulu, Hawaii

February 27 - March 3, 2002

CE084676

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Leading the Learning Organization

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This paper examines the actions that a leader can take in order to transform an organization into a learning organization. Four leaders of widely diverse organizations were studied. The research indicated that leaders who were successful in implementing the learning organization concept used it as the solution to a business problem, while devoting time and attention to the transformation. The findings have widespread implications for HRD practitioners, adult educators and for future research.

Key words: Leadership, Learning Organizations, Organization Development

The topic of the learning organization has commanded a great deal of attention. Senge's (1990a) writing was an important contribution to the avalanche of literature on the subject. Although the literature base pertaining to learning organizations is expansive, the vast majority of the writing is descriptive in nature. Few authors and researchers have offered suggestions to senior managers on how to transform their organization into a learning organization.

The purpose of this research was to capture the specific actions of those leaders who have successfully implemented the learning organization concept. It addresses the question of how senior managers and chief executive officers (CEOs) might apply specific leadership actions and behaviors in order to foster organizational learning. Argyris (1992), commenting on barriers to organizational learning, stated that:

> researchers did not focus upon producing actionable knowledge on how to reduce or lower these barriers. In those cases where they did, the advice was either disconnected from the world of practice, or, when examined carefully, the advice could actually strengthen the very barriers that were supposed to be overcome. (p. 1)

Theoretical Framework

Two bodies of literature provide the theoretical framework for this research: the learning organization literature is relatively new, while the leadership literature is vast. At the intersection of the two lies very little, and provides the subject of this research.

The Learning Organization

Watkins and Marsick (1996) wrote that three frameworks are useful for examining the 22 learning organizations contained in their edited work, *In Action: Creating the Learning Organization*. These three frameworks, from the simplest to the most complex, are that of:

1. Watkins and Marsick (1993);
2. Pedlar, Burgoyne, and Boydell (1991); and
3. Senge (1990a).

Watkins and Marsick (1993) offered the simplest definition when they defined a learning organization as one "that learns continuously and transforms itself" (p. 8). Pedlar et al. (1991) defined the learning company as "an organization that facilitates the learning of all of its members *and* continuously transforms itself in order to meet its strategic goals" (p. 1). Senge's (1990a) definition is the most complex. He defined the learning organization as one "where people continuously expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together" (p. 7).

Although these frameworks capture the fundamentals of the learning organization, two others deserve note. Marquardt (1996) defined the learning organization as one "which learns powerfully and collectively and is continuously transforming itself to better collect, manage, and use knowledge for corporate success" (p. 80). Garvin (1993) described the learning organization as one "skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights" (p. 80).

Widely cited in the literature were such diverse organizations as Shell Oil, Motorola, TRW Space and Defense Group (Redding & Catalanallo, 1994), Arthur Andersen, Caterair International, Royal Bank of Canada (Marquardt,

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1996), Johnsonville Foods, and Chaparral Steel (Watkins & Marsick, 1993). All of these organizations have achieved the transformation to learning organization status.

Leadership

Heilbrun (1994) pointed out that rigorous study of leadership is divided into three stages. The earliest stage attempted to identify traits of leaders. The next stage focused on the behavior of leaders, and the third and current stage centers on the interaction between leaders and those they lead. Heilbrun (1994) went on to say that the future of leadership studies might lie in the understanding that the most significant aspects of leadership are far beyond the ability to study them.

Many hundreds or even thousands of definitions of leadership exist, ranging from the abstract to the simple. Locke, Kirkpatrick, Wheeler, Schneider, Niles, Goldstein, Welsh, & Chah, (1991) offered one definition: "We define leadership as the process of inducing others to take action toward a common goal" (p. 2). Bethel (1990) proposed a more precise definition of leadership as simply "influencing others" (p. 6).

However, a more current definition of leadership was provided by Senge (1996), who defined leaders as people "who are genuinely committed to deep change in themselves and in their organizations" (p. 36). The most useful definition, though, was provided by Bennis (1984), who noted that "leaders are people who do the right things; managers are people who do things right" (p. 19). This separation of leaders from managers takes on great importance. Bennis and Nanus (1985) clarified this when they wrote that the "problem with many organizations, and especially the ones that are failing, is that they tend to be overmanaged and underled" (p. 21).

Although the discussion of leadership is important as a foundation for this research, the focus here is on leadership actions that transform organizations. Burns (1978) differentiated between transactional and transforming leadership. Transforming leadership, according to Burns, is the type of leadership that raises both leader and follower to "higher levels of motivation and morality" (p. 20). This idea was further amplified (Locke et al., 1993) to define transformational leadership as a type of leadership that changes organizations rather than maintaining them in their current state.

Bennis (1994) wrote that leaders are, by definition, "innovators" (p. 143). They must envision the desired state of an organization and take required action to enable the organization to achieve that state. Kotter (1996) identified eight stages of leading change: the first four involve reducing the forces that lead to the status quo, the middle stages introduce change, and the last steps incorporate the changed state into the fiber of the organization. The most detailed view of transformational leadership comes from Tichy and Devanna (1986). They wrote that transformational leaders revitalize organizations by recognizing the need for change, creating the vision for change, and enlisting the organization in the change process.

Leadership and the Learning Organization

At the intersection of the broad concept of leadership and the "murky" notion of the learning organization (Johnson, 1998, p. 148), there is little to provide specific guidance. Pagonis (1992) wrote that this must be accomplished "through rigorous and systematic organizational development" (p. 118). Senge (1993) posited that there is no formula or seminar for creating learning organizations.

Redding and Catalanello (1994) recommended that pockets of learning can form within an organization and may be shared with the rest of the organization. Senge (1990b) proposed that leaders need to be responsible for learning by building learning organizations, and Bennis (1984) wrote that leaders must value learning. Bennis and Nanus (1985) argued that leaders become expert at learning in the context of the organization, and Argyris (1991) insisted that leaders must learn how to learn. Senge (1990b) and others have stated that leaders must assume the role of teacher (Denton & Wisdom, 1991) in learning organizations.

Marquardt (1996) proposed what is possibly the most specific series of steps for leaders. He provided the "keys to success" along with the steps and strategies to achieve that positive outcome. According to Marquardt, the "keys" (p. 211) to a successful transformation to a learning organization are:

1. Establish a strong sense of urgency,
2. Form a coalition,
3. Create a vision,
4. Communicate the vision,
5. Remove obstacles,
6. Find short-term wins,
7. Consolidate progress and continue movement, and
8. Anchor change to the culture.

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Three Emergent Themes. Three areas emerge from the literature base that merit further consideration: visioning, empowerment, and the leader's role in learning (Johnson, 1998; Senge, 1993). The ability to create a collective vision of the future with other members of the organization (Watkins & Marsick, 1993) appears to be a crucial action for leaders of learning organizations. Communicating the common vision to the organization (Wheatley, 1992) seems to be of collateral importance. Marquardt and Reynolds (1994) referred to the information flow throughout the worldwide organization. Senge (1990a) called this the "purpose story" (p. 353) or the "overarching explanation of why they do what they do." He described the difference between the current and the desired state as building "creative tension" (Senge, 1990a, p. 357), or the force that can move followers toward the vision by allowing them to share it as they understand their current reality.

A second theme that emerged from the literature deals with empowerment. Marsick (1994) defined empowerment as "interactive, mutual decision making about work challenges in which power for work outcomes is truly shared" (p. 19). Linda Honold, formerly director of Member Development at Johnsonville Foods (Watkins & Marsick, 1993), was quoted as saying "the learning organization is the result of empowerment" (p. 208).

A third theme derived from the literature involves the leader's role in learning. Argyris (1993) called it the competence of "leading-learning" (p. 5). Marquardt and Reynolds (1994) indicated that the leader must model continuous learning. Barrow and McLaughlin (1992) indicated that this new kind of leadership would, by necessity, tie learning to strategy. Johnson (1998) provided a "Learning Organisation Leadership Model" (p. 146) that contains an "alignment" of the three leadership themes and Woolner's (1995) five-stage model of the learning organization. In this model, he essentially posits that the three leadership qualities, when blended in a specific fashion, allow an organization to move through the five stages as identified by Woolner (1995). This blending of qualities, according to the model, allows the organization to reach the ultimate goal as a learning organization.

Research Design and Methodology

Creswell (1998) referred to research design as the entire research process, not simply the methods. Yin (1989) similarly offered that the research design is a plan of action for getting from the original set of questions to the narrative containing the findings and conclusions. Merriam and Simpson (1995) wrote that the use of case-study research is appropriate when a gap exists in the knowledge base. The design of this research effort was a qualitative case study, and the unit of analysis was four individual leaders who had engaged in the process of transforming an organization into a learning organization. Stake (1995) indicated that the case is "a specific, a complex, functioning thing" (p. 2). In this study, in an attempt to understand this complex functioning, several selection criteria were used to select the individuals or the cases. First, there needed to be a commitment within the organization to become a learning organization. Second, the organization had to be cited in the current learning organization literature or must have as a written strategic business objective the learning organization outcome. Table 1 presents the demographics of the four research cases.

Table 1. *Demographics of Research Cases*

Demographic	Leader A	Leader B	Leader C	Leader D
Type of Org.	For profit	Government	Nonprofit	For profit
Industry	Manufacturing	Government	Secondary	High agency education technology
Location in U.S.	Midwest	East Coast	Midwest	East Coast
Gender	Male	Female	Female	Male
No. of Employees	6,000	18,000	50	30,000
Education level	Bachelor degree	Masters degree	Doctorate	Doctorate
Stage of initiative	Completed	Completed	Ongoing	Early

Data were collected using semi-structured interviews, document and archived record reviews, and researcher observations. To insure validity, like questions were asked of each respondent (Merriam, 1988) and at least two

other sources were interviewed within each leader's organization. Interviews were recorded and later transcribed verbatim by the researcher. Interview transcripts were coded and analyzed by the researcher to determine themes. The 'Data Analysis Spiral' (Creswell, 1998, p. 143) was utilized as the basis for data analysis. In order to minimize the effects of researcher bias, two trusted peers continually provided feedback during the research process.

Guiding this study were three research questions:

1. What precipitated the decision to transform the organization into a learning organization?
2. Why is the learning organization concept chosen as a desired outcome?
3. What specific actions by leaders enable them to develop a learning organization?

Research Findings

Results drawn from the data are organized and presented according to research question and are summarized in Table 2. Research Question 1 asked, "What precipitated the decision to transform the organization into a learning organization?" The data showed that two factors contributed to the decision to embark on a learning organization initiative. The first was a clearly delineated business problem. One of the leaders typified this when he indicated that:

> Basically, what it was is we had just suffered through a year in which we had lost $50 million. And we were on the blocks in 1992 when [the former CEO] was still in charge. He was pretty disappointed with us and we were always hearing rumors that we were going to be gone. And what we realized we needed to do was we needed to do a couple of things. We needed new technology. We had to have the design and release of our own parts. We had basically just been an assembler of parts that were designed by engineers. So we needed our own technology. We needed to become full service, be responsible for our own design and responsibility; we had to go global.

The second contributing factor reported was that learning was either implicitly or explicitly stated in the charter of the organization. Another leader amplified this by saying:

> I think there was always a grounding that this was a place of learning, this is a community that needs to reflect on what is known, that needs to create feedback mechanisms to insure that learning is known and mutually shared, that needs to develop a collective sense of ownership, that needs to be grounded because of the feeling that the stronger and clearer our beliefs and mission were, the more freedom people would have to implement and act [on] those in their own way. We all always wanted, I think, a sense of adaptation and flexibility.

The common theme discovered was that the leader must clearly identify the need for increased learning, while articulating this need to the organization in a way that makes sense. Identification of this need may take many forms; economic survival, or a core function of the organization. Regardless, this research showed that a logical rationale must underlie the inception of the learning organization initiative. This notion supports many of the tenets found in the leadership literature but was best presented by Tichy and Devanna (1986) when they wrote that leaders must recognize the need for change.

Research Question 2 asked, "Why is the learning organization concept chosen as a desired outcome?" The research indicated three reasons. First, the learning organization concept was chosen as a solution to a real business problem. It can not be viewed as simply a "quick fix or panacea" (Senge et al., 1994, p. xii). One leader described this when he said,

> And it was shortly thereafter that we needed to tap our biggest problem at that time, which was launching new products. And we had some launches going on at that time that were very difficult. They just devoured the whole division. And we said, we've got to learn from these things because we are going to be launching a lot of new products in the future. We can't go through this pain. So we put together a cross-functional team involved with launching new products. And they immediately decided that they needed to expand to incorporate more of the other departments that are involved in the launch of a new product.

Second, the leaders chose the learning organization concept because it fit their own mental models. All four leaders chose this as an organizational outcome because it fit with their previous life experience. One leader provided an example when she said:

We didn't think about being a learning organization. And that is why I don't believe it was a conscious decision to be a learning organization. I think people maybe read about it and maybe people decide they want to do it, but certainly in our case, it didn't evolve that way. There was an interest in learning and our organization was about learning and the agency was about learning. It was about the agency learning.

Third, none of the leaders studied utilized a specific model or framework to guide them in their journey. Such

an abstract concept as the learning organization appeared to be difficult for the organizations to understand.

Research Question 3 asked, "What specific actions by leaders enable them to develop a learning organization?" This question rested at the center of this research project. The research uncovered several effective leadership actions. First is that they paid attention themselves to the learning organization initiative. One of the interviewees said, "What [he] did was he basically endorsed it, made sure it was part of the strategic initiative so he gave it visibility, and then he attended as many dialogue sessions or team learning project meetings as he possibly could." This supports the importance of "leading-learning," proposed by Johnson (1998) in the Learning Organization Leadership Model and drawn from Argyris (1991, 1992, 1993).

Second, and allied to the importance of personal attention by the leader, was the importance of the leaders insisting that others in the organization pay attention to the initiative. The idea that everyone in the organization must pay attention to learning ran through the data. In practice, this may mean the inclusion of organizational learning as a strategic planning initiative. One leader clarified this when she reported:

> We began a formal strategic planning process, which created a team of stakeholders where you have to craft a belief statement–and your mission, and your objectives, and strategies, and action plans. And this is a new way of thinking for the organization. We were brand new, and we had all come together and [been] drawn in some way to a mission and a vision of what was articulated and drawn to a sense of possibility that every person brought to the institution. Table 2 summarizes the results of this research.

Table 2. *Summary of Research Findings*

Research Question	Leader A	Leader B	Leader C	Leader D
1. Precipitating factors	Survival	Charter	Core Product	Survival
2. Why chosen	Fit previous experience	No conscious decision	No conscious decision	Knowledge capital
3. Leadership actions	Paid attention Made others risk	Visioning Encouraged others	Naming things Paid attention Rewards	CEO attention Paid attention
Additional researcher observations	Position power Shared issues	No position power Leadership issues	Position power Contextual	No position power Contextual

Summary and Discussion

By studying four leaders who embarked on learning organization initiatives, this research indicated that:

1. The decision to develop a learning organization should be based on a clearly defined business need, or business problem, or was stated in the charter of the organization.
2. The learning organization notion must be analyzed and determined to be the rational solution to this business need or problem. Even though none of the leaders used a specific framework, the learning organization concept must fit their own mental model.
3. Leaders need to pay attention to this initiative, ensure that others in the organization are focused on it, and institute an appropriate reward system. The attention and focus required may take place in the strategic planning process.

Several additional findings were uncovered by this research:

1. The process of crafting a learning organization cannot be initiated or sustained by those who do not hold a position of power within an organization. For example, it is doubtful that human resource development directors can successfully begin this process. Top business leadership must initiate or at least fully sanction this effort. This supported by Watkins and Marsick (1993) when they asserted that "You cannot build a learning organization from within the training department" (p. xvii). Leaders must then make others aware of the need for carefully chosen strategic initiatives. The initiative must be tied to strategy in order for it to be successful. Successful implementation of the learning-organization concept is dependent upon practitioners who reside in positions of organizational influence or obtain clear support from those in positions of power. This research indicates that successful implementa-

tion cannot be achieved without access to positions of power and influence. Thus, leaders must devote personal attention to the initiative, and others in the organization need to also focus attention on it.

2. Leaders need to have the tools for analyzing problems and selecting appropriate solutions. Widely accepted are tools that described a rational decision-making process that includes establishing goals and objectives, identifying problems, developing alternatives, choosing among alternatives, and evaluating outcomes. Leaders need to be skilled at analyzing business situations, diagnosing the causal factors, then selecting appropriate interventions, such as the learning organization.

3. Once it is deemed appropriate for the situation, leaders need to be skilled in communicating the learning organization concept in a manner that fits as a solution to the business problem, while motivating others in the organization. People in the organization must be able to clearly see this fit. Kepner and Tregoe (1997) wrote that:

> People do not resist practical and useful ideas that promise to be supportive of their own best interests. People do resist obscure theorizing that has no apparent helpful reference to their lives, threatens them because of their strangeness, and must be taken widely on faith. (p. 221)

4. Learning about learning is important; people need to know more about their own and the organization's learning processes.

Implications for Future Research

This research looked closely at four organizational leaders who had embraced the learning-organization concept and offered valuable insight into this phenomenon. However, more research is needed to expand the literature base. Additional case studies of both successful and unsuccessful learning organization implementations can provide further insight into this nebulous arena. Several research questions that pertain to this topic need to be addressed:

1. What types of data can indicate the need for increased learning in an organization?
2. In what ways can increased organizational learning provide the solution to this delineated problem?
3. How can leaders successfully engage the members of an organization in this initiative?
4. How can successful organizational learning be measured?

Findings from these research initiatives then need to be empirically tested and confirmed through quantitative methods. In some ways, this research indicates that theorists are working at a level that is too abstract for practitioner leaders to comprehend and utilize. A clear model or framework must be developed that will allow practitioners and adult educators to more fully understand the learning organization. This model needs to answer the dual questions: "What exactly is the learning organization?" and "What specifically must I do as a leader in order to implement it?" In addition, methods need to be developed that will allow for the translation of organizational performance measures into learning\ outcomes.

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An Examination of Psychometric Properties of Chinese Version of the Dimensions of Learning Organization Questionnaire (DLOQ) in Taiwanese Context

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This paper reports a study designed to examine psychometric properties of Chinese version of the Dimensions of Learning Organization Questionnaire (DLOQ) instrument. The instrument was translated into Chinese by a team of researchers and data was sought from organizations in Taiwan. The results of psychometric analyses revealed that the Chinese version of the DLOQ demonstrated reasonable reliability estimate and seven-dimension factor structure was stable in Taiwanese contexts. The evidence of predictive validity was obtained as the seven dimensions of learning could successfully predict different types of organization and had statistically significant correlation with perceptual measures of organizational performance.

Keywords: Learning Organization, International HRD, Organizational Performance

Learning organization is one of the key concepts in the field of human resource development. Although this concept has been introduced in many Asian countries, few empirical studies have been conducted to examine the validity of such concept in Asian contexts. Especially in Taiwan, through the translation of Senge's (1994) *The Fifth Discipline*, companies fascinate about the concept of learning organizations. The more theoretical advantages of the learning organizations were discussed in the practice and scholars (Hong & Chang, 1998; Yang & Hu, 1994; Sun, 1995), the more empirical study was needed (Chou, 2000; Li, 2001; Guan,1999; Guan, 2001). The following questions were raised the attention among the practitioners and scholars: What are the indicators or characteristics of a learning organization? To what extend, a learning organization can be measured in terms of the organizational performance? To what extend, Taiwanese companies can adapt the concept of learning organizations and apply to their situation and even create more benefits?

The purpose of study is to translate, validate and adapt an English version of a scale measuring the characteristics of learning organization so that it can be used in Chinese-speaking population. The Dimension of Learning Organization (DLOQ) was used to test if the concept of learning organization and proposed dimensions by the authors are valid in Taiwanese context.

The Dimensions of Learning Organization Questionnaire (DLOQ) was developed by Watkins and Marsick (1997) and have been widely used to assess the characteristics of learning organization. This scale includes 43 items assessing learning activities in the organization. Six (6) additional items were included to measure Knowledge Performance and another six (6) items were used to assess Financial Performance. The knowledge performance was defined as enhancement of products and services because of learning and knowledge capacity; and financial performance was defined as the state of financial health and resources available for growth. A number of studies have already examined psychometric properties of the DLOQ in terms of its reliability and validity (Watkins, Selden, Marsick, 1997; Watkins, Yang, Marsick, 1997; Yang, Watkins, Marsick, 1998). Ellinger, Ellinger, Yang and Howton (2000) examined the association between measures included in the DLOQ and several objective measures of firm financial performance. It was reported that more than 10% of variance in firm the financial indicators could be explained by seven dimensions of leaning organization measured on the DLOQ. The DLOQ has been translated and used in different cultural contexts. It has been used in Malaysian organizations (Sta. Maria & Watkins, 2001). It was found that the dimensions of learning organization and concerns about the innovation together explained 36%

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of the variance in the use of innovation. Hernandez (2000) reported findings from translation, validation and adaptation study of the DLOQ in Latin American context. It was found that the Spanish version of the instrument was a reliable and valid instrument.

Theoretical Framework

The theoretical foundation for this study is the Watkins and Marsick conceptualization of the learning organization (1993, 1996, 1999). They define the learning organization as one that captures, shares, and uses knowledge to change the way the organization responds to challenges. They further suggest that the design of learning organization depends on seven complimentary action imperatives: (1) create continuous learning opportunities (*Continuous Learning*); (2) promote inquiry and dialogue (*Dialogue and Inquiry*); (3) encourage collaboration and team learning (*Team Learning*); (4) empower people toward a collective vision (*Empowerment*); (5) establish systems to capture and share learning (*Embedded System*); (6) connect the organization to its environment (*System Connection*); and (7) provide strategic leadership for learning (*Strategic Leadership*).

Research Questions

This study sought to examine psychometric properties of the Chinese version of the DLOQ in Taiwanese context. Specifically, this study addresses the following research questions:

1. Is the Chinese version of the DLOQ a reliable instrument in terms of internal consistency for the proposed dimensions of learning organization?
2. Is the seven-dimension framework of learning organization proposed by Watkins and Marsick applicable to Taiwanese organizations?
3. Does the Chinese version of the DLOQ demonstrate predictive validity in terms of discriminating different types of organizations in Taiwanese contexts?
4. To what extent that perceived measures of organizational performance can be explained by learning characteristics measured by the Chinese version of the DLOQ?

Methods

Translation

The English version of the DLOQ (Watkins & Marsick, 1997) was first translated into Chinese by three researchers. Two of them conducted initial translation. Both of the researchers were native Chinese and they all obtained graduate degrees of HRD in American universities. One of them has returned to China as a faculty member in a business school, and the other is currently teaching in an American university. In this initial translation process, efforts were made to use common Chinese equivalents for all words and phrases and to translate the original text as close as possible. This initial translation was done independently. After each of the researchers has finished the first translation, each of them critiqued and evaluated the other's work. It was found that two researchers shared same or very close translations for the majority of the instrument. The consensus part was kept, and the different areas were debated and modified until a consensus was reached. Very few areas were found too difficult to reach the consensus and they tend to be words or phrases with particular meanings that have different usages in Chinese. For example, there is no exact word or phrase that represents the word of "vision." In fact, there are two common usages in research and business world. One implies "long-term picture" and the other refers to "shared long-term goals." It was decided to use the later one after consulting with other Chinese HRD scholars and practitioners.

A third researcher, whose native language is Chinese, served as an independent judge for the previous translations. The person is on faculty in a Taiwanese university and has obtained graduate degree of HRD from an American university. Due to the context differences between Mainland China and Taiwan, the habitual usage of the Chinese language in words or phases was slightly different between two places. However, two other Taiwanese HR professors, who both graduated from the American universities, were invited to confirm the minor changes between the simplified Chinese version and the traditional Chinese version. With slightly modification of several specific words or phases, the traditional Chinese version of DLOQ was distributed for Taiwanese organizations.

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Sample

After contact several Taiwanese companies, five medium to large size private corporation, which are known or promoted the learning organization concept, were invited to participant this study. Two of them were highly reputed finance/insurance companies, three of them were considered as high-tech companies. With the full response rate, a total of 679 subjects consist of a random sample from multiple organizations. Three hundred and forty (340) subjects out of all six hundred and seventy-nine (679) subjects were randomly selected from the two finance/insurance companies. Most of the subjects are on the management and administration position, others are sales. In addition, three hundred and thirty-nine (339) subjects out if six hundred and seventy-nine (679) subjects were randomly selected from the three high-tech companies. Most subjects selected from the high-tech companies are both include management and non-management (technical/professional).

Data Analysis

To address the first research question, item analysis procedure was used to assess the internal consistency for each of seven proposed dimensions of learning organization in a different context. Each of the items included in the DLOQ was examine in terms of its correlation with proposed dimension. Cronbach's coefficient alpha was used to assess the reliability of the scale.

Confirmatory factor analysis (CFA) was utilized to determine the dimensionality and factor structure of the Chinese version of the DLOQ. The CFA was conducted with LISREL 8 program (Jöreskog & Sörbom, 1989, 1993a, 1993b). CFA is a statistical procedure that examines the construct validity of an instrument with pre-specified dimensions and associated measurement items. In this study, we are particularly interested in assessing whether the seven-dimension structure proposed in the DLOQ constitutes an adequate measurement model for the learning organization concept in Taiwanese context. Yang, Watkins and Marsick (2000) conducted an extensive series of exploratory and confirmatory factor analysis and found that a reduced 21-item measurement model yielded superior fit indices than the original 43-item model. Consequently, two measurement models were examined to assess the adequacy of seven-dimension factor structure of the DLOQ in the new context: one for all 43 learning organization items and another for the reduced set of 21 items.

Discriminant analysis was used to assess the extent to which the Chinese version of the DLOQ could be used to successfully classify different types of organizations. It was reasoned that different type organizations could be predicted from the measures in the DLOQ because of their different backgrounds and emphasis in learning activity. Predictive discriminant analysis (PDA) was used to predict group memberships based on a linear combination of set of predictors (Huberty, 1994). We reasoned that the predictive validity is evident for the measures of learning organization when they can be used to predict different types of organizations. In the current case, two major types of organizations were included, finance/insurance and high-tech companies.

In answer fourth research question, canonical correlation was selected to assess the association between dimensions of the learning organization and perceptual measures of firm performance. This is a technique for examining the association between two sets of variables (Stevens, 1996). The underlying principle is to develop a linear combination of each set of variables (both dependent and independent variables) in a manner that maximizes the correlation between the two sets. The canonical analysis was conducted by MANOVA procedure using SPSS program (Norusis & SPSS Inc., 1990).

Results

Estimating Reliability

Table 1 presents a comparison of the reliability estimates of the DLOQ among different studies. Cronbach's coefficient alpha was used to estimate the reliability for the measures included in the DLOQ. The table also reports corresponding estimates in other studies. In all but two subscales, the reliability estimate was comparable with previous studies conducted in America and Colombia. Three subscales, *Continuous Learning, Empowerment* and *Embedded System*, had relatively low internal consistency. A careful examination of the item analysis results revealed that each of these three subscales was crippled by one measurement item. Item 5, "In my organization, people are given time to support learning," had relative low item-total correlation. This might be caused by the fact that this item implies slight different meaning in the Chinese version. The Chinese version might have caused the respondents to perceive as to "be given learning time" rather than to "be given time to support learning."

Consequently, the respondents might have viewed this question as a reflection of reward rather than something indicating organization's effort to create continuous learning opportunities for employees. Therefore further modification of item 5 is needed in future instrument refinement. Nevertheless, the coefficient alpha for the subscale of "*Continuous Learning*" has reached .81 when item 5 was removed from this subscale.

Although the reliability estimate for "*Empowerment*" (α = .75) was somewhat lower than those revealed in other studies, it reached an acceptable level (α = .82) when item 29 was excluded from the scale. Item 29 was stated as: "My organization give people control over the resources they need to accomplish their work." A careful re-examination of the Chinese translation failed to reveal any linguistic mismatch with the original English version. Special attention needs to be paid to monitor the performance of this item in future study.

Table 1. *Reliability Estimates for the DLOQ Measures*

Dimensions	America		Colombia	Taiwan
	Yang et al. (N = 469)	Ellinger et al. (N = 208)	Hernandez (N = 906)	Current Study (N = 679)
Continuous Learning	.79	.81	.80	.72
Inquiry & Dialogue	.85	.86	.81	.89
Team Learning	.84	.85	.79	.86
Empowerment	.75	.84	.81	.75
Embedded System	.80	.85	.81	.71
System Connection	.82	.87	.80	.89
Provide Leadership	.86	.89	.84	.91
Knowledge Performance	.74	.80	.82	.87
Financial Performance	.71	.75	na	.89

The reliability estimate for "*Embedded System*" in this study (α = .71) was significantly lower than those in other studies (ranging from .80 to .85). Item 24, "My organization makes its lessons available to all employees," was the one that contributed the decreased internal consistency. The coefficient alpha reached slightly higher level (α = .75) when item 24 was deleted from the item analysis. No obvious linguistic difference was found in examining the English and Chinese versions of this item and other items included in this subscale. This unexpected performance of item 24 in Taiwanese context might be explained by the influence of traditional Chinese culture. "Face-saving" tends to be very important in the Chinese society (Earley, 1997). Thus it is quite rare for a formal organization to openly admit any lessons because such action implies some mistakes or wrong doing. The fact of relative low internal consistency for the measures of "*Embedded System*" in a Chinese context might also be explained by different managerial approaches between the West and the East. Yang and Zhang (2001) contend that Western managerial emphasis is placed on system and structure of the organization, and that the Eastern managerial emphasis tends to target on the human side of organization (i.e., process and practice). Consequently, measures of "*Embedded System*" developed in a Western culture might be less consistent when they were used in an Eastern context. Although few subscales tend to demonstrate less desirable reliability estimates, none of the reliability estimate was below .70 and most of them have shown acceptable reliability estimates.

Assessing Factor Structure

Table 2 presents the fit indices for the two measurement models as the results of confirmatory factor analysis. Six criterion indices were chosen to evaluate the fit between the proposed measurement model and that generated from the sample. The indices selected were the traditional chi-square (χ^2) test, Jöreskog and Sörbom's (1989) goodness of fit index (GFI) and goodness of fit index adjusted for degree of freedom (AGFI), Bentler's (1990) comparative fit index (CFI), Bentler and Bonett's (1980) non-normed fit index (NNFI), Steiger's (1990) root mean square error of approximation (RMSEA) and Jöreskog and Sörbom's (1989) root mean square residual (RMR). The GFI and AGFI reflect the proportion of joint amount of data variance and covariance that can be explained by the measurement model being tested. The NNFI is a relative fit index that compares the model being tested to a baseline model (null model), taking into account the degrees of freedom. The CFI indicates the degree of fit between the hypothesized and null measurement models. The RMR is a measure of the average of the fitted residuals. The RMSEA represents a real advance in the evaluation of model fit from both a statistical and a conceptual viewpoint. Browne and Cudeck (1993) argue that because theoretical models are at best approximations of reality, the null hypothesis for any measurement/structural equation model (i.e., the conventional chi-square test that the data fits the

model perfectly) will rarely be true. Rather than testing the null hypothesis of *exact fit* between the covariance matrix of sample and that of model for population, RMSEA establishes a hypothesis of *close fit* between the model and population. RMSEA values of .05 or less indicate a very close fit between sample and theoretical model, accounting for degrees of freedom. Values less than .08 reflect reasonably well fitting models (Browne & Cudeck, 1993).

Table 2. *Fit Indices for Measurement Models of the DLOQ*

Fit Index	Full 43 Items	Reduced 21 Items
χ^2	4128.69	830.21
df	839	168
χ^2/df	4.92	4.94
RMSEA	.076	.076
RMR	.046	.042
GFI	.74	.89
AGFI	.70	.85
NNFI	.85	.92
CFI	.86	.93

The CFA results for the Chinese version of the DLOQ offered further evidence for the dimensionality of learning organization proposed by the theorists. Although the seven-dimension factor structure with 43 items fitted the data moderately well, reduced 21irtems of the same factor structure fitted the data reasonably well. Nearly 90% of item variance and covariance was explained by the seven-dimension factor structure (GFI = .89). Both non-normed fit index (.92) and comparative fit index (.93) were above .90, a critical level that has been normally regarded as an indication of good mode-data fit. Furthermore, RMR and RMSEA have been reasonably low (RMR < .05 and RMSEA < .08) and that suggested overall fit between the proposed seven-dimension model and the data. In sum, the seven-dimension framework of learning organization proposed by Watkins and Marsick has demonstrated its applicability to Taiwanese organizations when their learning activities were measured by the Chinese version of the DLOQ.

Determining Predictive Validity

Predictive validity is the extent to which an instrument can successfully predict criterion measurement (Crocker & Algina, 1986). It was reasoned that the predictive validity would be evident if measures on the DLOQ could successfully predict different types of organization and organizational performance. Table 3 reports the prediction results for two organizations based on seven dimensions of learning organization measured on the Chinese version of the DLOQ. Prior probabilities were set at the proportions of two types of organizations. The results indicate that 63.9% of all participants were correctly classified as belong to either finance/insurance or high-tech organizations.

Table 3. *Classification for Different Types of Organization Based on the DLOQ*

Actual Group Membership	Number of Participants	Predict Group Membership	
		Finance/Insurance	High-Tech
Finance/Insurance	340	64.7%(220)	35.3%(120)
High-Tech	339	36.9%(125)	63.1%(214)
Percent classified correctly: 63.9%			

Note: Numbers of participants are shown in brackets.

To further assess the predictive power of the seven dimensions of learning organization measured on the Chinese version of the DLOQ, we evaluated the effectiveness of the prediction by the discriminant function based on a formula suggested by Huberty (1994, pp. 103-106). For the current prediction results, we obtained that the standard normal statistic is $z = 7.25$ ($p < .001$), which clearly indicates a better-than-chance results. In other words, by using a classification rule of the discriminant function based on the seven dimension of learning organization, significant fewer errors would be made than if classification were done by chance. The above results suggest that the Chinese version of the DLOQ has demonstrated a strong predictive power in classifying different types of organizations.

The second type of predictive validity evidence was found when a canonical correlation analysis was conducted where the perceptual measures of organizational performance were treated as a set of dependent variables and seven dimensions of learning organizations were put as predictors. Table 4 shows the results of the canonical correlation analysis and demonstrates the overall effects of the seven dimensions of learning organization on organizational performance.

Table 4. *Multivariate Tests of Significance for Canonical Correlation*

Test Name	Value	Approx. F	Hypoth. df	Error df	Sig of F.	Effect Size
Pillais	.433	26.260	14	1342	.000	.216
Hotellings	.742	35.421	14	1338	.000	.270
Wilks	.572	30.866	14	1340	.000	.244
Roys	.422					

The multivariate tests for the canonical correlation analysis indicate a statistically significant relationship between the seven dimensions of learning organization and the two perceptual measures of organizational performance ($p < .001$). Effect sizes of the canonical correlation range from .216 to .270, suggesting that mo re than one fifth of the variability in the respondents' perceptions of organizational performance can be attributed to the seven dimensions of leaning organization. The above results are comparable to the previous studies (Ellinger et al., 2000; Yang et al., 1998). In summary, our analyses offer support for the predictive validity of the Chinese version of the DLOQ instrument in Taiwanese contexts.

Conclusions and Discussions

The Chinese version of the DLOQ has revealed similar psychometric properties to the original instrument. First of all, the Chinese version has demonstrated acceptable reliability estimates in terms of internal consistency. Few items seem to imply different meanings because of cultural contexts and thus have caused somewhat decrease of the reliability estimates. Future studies should pay attention to these items and be aware of the cultural differences in utilizing the instrument. Maybe in translating and adapting an instrument, there is a need of modifying and developing more culturally relevant items.

Secondly, the seven-dimension factor structure proposed by the learning organization theorists was stable in Taiwanese contexts. In fact, the results for the statistical indices of data-model fit have been better than those registered with the original one. The proposed seven dimensions accounted for nearly three quarters of learning activities reported in the full 43-item instrument, and it explained nearly 90% of variations of the learning activities reported in the selected 21 questions. The results of model fit indices suggested that the proposed seven dimensions of learning organization are applicable in Taiwanese contexts.

Thirdly, the Chinese version of the DLOQ has demonstrated strong predictive validity in terms of classifying different types of organization and predicting perceived organizational performance. The results of data analysis show that a discriminant function could be built on the measures of the DLOQ to successfully predict participant's organizational type. Forty-three percent of the participants could be classified into correct organizational memberships based on the seven dimensions of learning organization proposed in the DLOQ. Moreover, the seven dimensions of learning could be used to predict perceived organizational performance. It is thus concluded that the Chinese version of the DLOQ has demonstrated reasonable predictive validity.

Implications for Research and Practice in HRD

This study has implications for both research and practice in human resource development. This study offers some preliminary evidences of reliability and validity for a Chinese version of the DLOQ. The Chinese version of the DLOQ thus can be used in organizational studies in several regions where Chinese is official language (i.e., China, Hong Kong, Singapore, Taiwan). The positive evidence of psychometric properties of the Chinese version of the DLOQ suggests some potential cross-culture avenues. However, this study provides an empirical data on which seven-dimensions as determinants of learning organization in Taiwanese context. It offers a cross validity evidence for the DLOQ in Taiwanese context. The results of the study show that the seven-dimension concept of learning organization proposed in the USA tends to be applicable to organizations with different culture. It also suggests that the DLOQ can be used to assess cultural differences in building learning organization. The instrument can also be used along with other valid assessment tools to reveal cultural factors influencing the effort of organization development.

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This study also has practical implications for the HRD practice. For those multi-national and international organizations that have branches or joint ventures in Chinese-speaking region, the DLOQ offers a valid tool in evaluating and planning organization development efforts across the regions. For native organizations in the Chinese-speaking countries, the Chinese version of the DLOQ offers a timely assessment device.

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Our Two-Tiered Learning Organizations: Investigating the Knowledge Divide in Work-Related Learning

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This study investigated differences in work-related learning patterns and awareness of organizational policies that impacted the level of learning among 1,031 full-time employed adults. Significant differences were found in the adults' self-reported current and preferred learning patterns and awareness of work-related learning policies when examined by education level and occupation category. The findings suggest that a knowledge divide is evident in our organizations. The results have programmatic and policy implications for HRD professionals.

Keywords: Knowledge Divide, Work-related Learning, Learning Organizations

In their book, *The Monster Under the Bed*, Davis and Botkin (1994) warn us of a two-tiered society inhabited by knowledge haves and have-nots (p. 158). It is proposed in this paper that a knowledge divide exists in some organizations and that their concern was well-founded.

Despite steady increases in dollars allocated to training and development, all is not equal in our learning organizations. We know, for instance, that:

1. The extent to which organizations embrace learning varies. On average, corporations spend about 2.0% of payroll on education for their employees (up from 1.8% in 1997), ranging from negligible amounts to as much as 4.4% for leading edge corporations (McMurrer, Van Buren, and Woodwell, 2000).
2. The level of training that employees receive is not evenly shared across organizations. For example, organizations with the highest level of training tend to be in the areas of transportation, communications, and utilities with the lowest levels in public administration, education, and health services (Industry Report, 1998 & 1999).
3. There is wide variance in the amount of training individuals receive by occupation, pay, and by education level (McMurrer, Van Buren, and Woodwell, 2000). Employee education centers upon learning for managers and professionals, productivity for service workers, and basic schooling for unskilled workers, in that order (Davis and Botkin, 1994, pp. 85-86).
4. The greater one's education level the more likely one will receive additional training. The typical firm trained 77% of workers with some higher education compared to 49% of employees with less than a high school education (Bassi and Van Buren, 1999, p. 13). Hight (1998) found in his survey of over 12,000 adults that only 6% of workers with less than a high school education participated in employer training during the previous twelve months. In contrast, 46% of workers with some college and 63% of workers with college degrees received employer provided training. A similar variation was found in the level of training by education by Frazis, Gittleman, Horrigan, and Joyce (1998), and by Barron, Berger, and Black (1997).
5. The illiteracy rate continues to climb while corporations dedicate fewer dollars to basic skills training. Literacy problems cost American companies an estimated $60 billion dollars in lost productivity with 90 million adults defined as functionally illiterate (Baynton, 2001). As many as 38% of job applicants lack the necessary basic skills in reading, writing, and math to do the jobs they desired, an increase of 15% over the past two years (Baynton, 2001). It is estimated that only 13% of American companies offered remedial training to employees – a decrease from a high of 24% in 1993 (Baynton, 2001).
6. "At present, too many of us view learning as a nice addition to our lives, but not as the essential characteristic that contributes to our ability to prosper in business" (Wheatley, 1994, s47).

The purpose of this study was to determine if a two-tiered system of knowledge haves and have-nots was discernable in adults' self-reported work-related learning patterns and behaviors. This study was part of a larger research project that explored the extent to which working adults indicated they embraced work-related learning as an essential characteristic or core value in their work setting and lives, and their awareness of organizational policies

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and benefits that impacted their level of learning. This paper supplements and highlights aspects of the research published in the Fall 2001 issues of the *Human Resource Development Quarterly* (Westbrook and Veale, 2001a) and the *Journal of Continuing Higher Education* (Westbrook and Veale, 2001b). It is the intention of this paper to share research results that provide evidence of a knowledge divide existing in our organizations. It is hoped that the information presented in this paper will prompt discussion about the implications of the knowledge divide for our work as HRD professionals.

Work-related learning was defined as the formal and informal education and training adults completed at work or at home to assist them in their current and/or future employment. Two demographic or background variables were investigated to determine if a knowledge divide could be identified in numerous work-related survey questions. The variables were education level and occupation category. The following research questions guided this study:

1. Is there a significant relationship between the education level and occupation category of adult workers in the sample?
2. Is there a significant difference in the amount of time adult workers devote and would prefer to devote to various work-related learning activities when examined by education level and occupation category?
3. Is there a significant difference in the comfort level of adult workers regarding the amount of time dedicated to self-directed, work-related learning while at work when examined by education level and occupation category?
4. Is there a significant difference in the awareness of adult workers regarding various organizational policies that support work-related learning when examined by education level and occupation category?

Sample & Methodology

The data from this study were obtained by 73 students enrolled in a graduate adult education class facilitated by one of the researchers from 1996 to 1998. In 1997 the class was held via a fiber-optic interactive telecommunications system at eight locations in Iowa. The sample consisted of 1,031 adults employed full-time in 60 organizations in Iowa. The organizations included manufacturing and service providers, profit and nonprofit corporations, as well as state government and educational institutions. The sample, delineated by education level and occupation category, is listed in Table 1.

Table 1. *Demographic Profile of the Sample*

Item	N	Percent
Education Level		
High school	126	12.2
Some college	183	17.7
Two year degree	114	11.1
Four year degree	475	46.1
Graduate degree	119	11.5
Missing	14	1.4
Total	1,031	100.0
Occupation		
Clerical/Support	122	11.8
Manufacturing/Processing	123	11.9
Supervisory/Management	244	23.7
Professional	457	44.3
Other	68	6.6
Missing	17	1.6
Total	1,031	100.0

A snowball sampling method was used to derive the sample. Snowball sampling is a method whereby individuals with desired traits survey another set of subjects with desired traits (Black, 1999). In this instance, working adults enrolled in a graduate credit class at a private university in Iowa surveyed other adults working in their organizations. This type of sampling is applied when there are no lists of population members – or, as in this case, where that list would be extremely difficult to develop. A drawback of this procedure is its lack of randomness. Thus, there is no assurance that the sample is representative of the population of adult employees in Iowa.

After reviewing pertinent literature, an author-constructed questionnaire was designed, administered, and analyzed during the fall semester of 1995. Upon tabulating and evaluating the results, the questionnaire was edited and used during the summer and fall terms of 1996 through 1998.

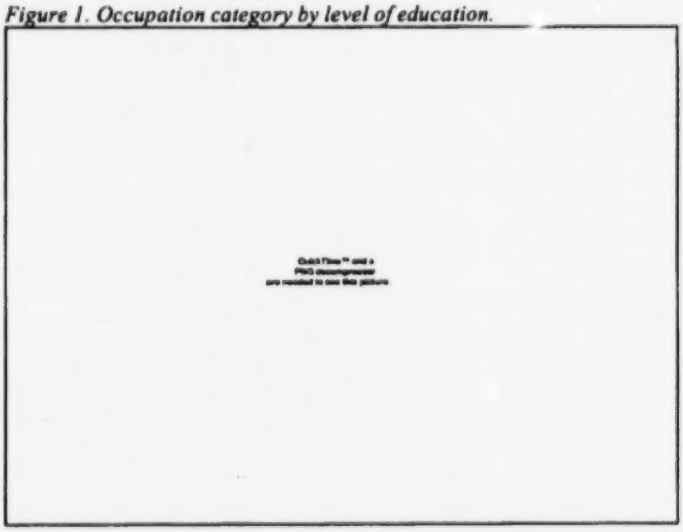
Various statistical operations were performed on the data obtained from the survey. The demographic variables of education level and occupation category were analyzed to determine the influences of each variable on the responses to the questions of the survey. Only statistically significant results are reported in this paper. Because of the non-normality of the data, nonparametric tests were applied. Differences were reported at the .05 level of significance. The Bonferroni adjustment was used for conducting multiple comparisons to control the overall Type I error rate (Milliken and Johnson, 1992; Fuchs and Kenett, 1980).

Findings

Research Question 1. Is there a significant relationship between the education level and occupation category of adult workers in the sample?

A significant relationship (P=.000) was found between the education level and occupation categories of the adult workers in the sample. Upon inspection of the cross-tabulations, the difference was attributed to the occupation categories of clerical/support and manufacturing/processing when compared with the categories of supervisory/ management and professional. Among those adults who have earned two-year, four-year and graduate degrees, there was a much higher percentage of adults who were employed in supervisory/management and professional occupations, while among high school graduates there was a higher percentage of adults in clerical/support and manufacturing/processing occupations (see Figure 1).

Figure 1. Occupation category by level of education.



Research Question 2. Is there a significant difference in the amount of time adult workers devote and would prefer to devote to various work-related learning activities when examined by education level and occupation category?

The respondents were asked to list the average number of hours spent on eleven work-related learning activities. These activities ranged from reading professional/education literature and attending in-house staff development/training programs to attending conferences, seminars and other continuing education programs. The respondents were then asked to list the average number of hours they would prefer to spend on each activity to stay current of the knowledge needed to remain current in their line of work.

Utilizing the Wilcoxen signed ranks test, the differences between the current and preferred amount of time dedicated to the work-related learning activities were tested. A significant difference was found in each of the eleven activities (see Westbrook and Veale, 2001a). In each instance the individuals indicated a preference for spending an increased amount of time on work-related learning activities to stay current of the knowledge in their line of work.

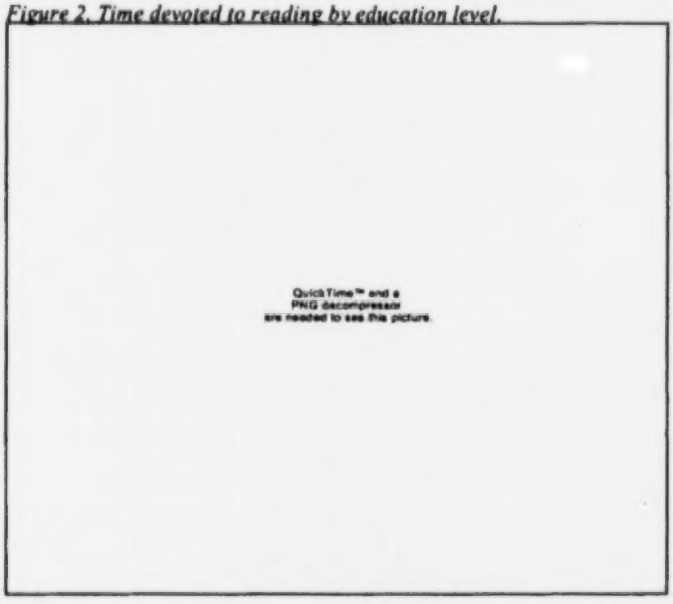
Significant differences were also found in the current and preferred number of hours devoted and the preference gap (preferred minus current) when examined by the adults' education level and occupation category. For education level, the areas were "reading professional/educational literature," "use of company or local library," and "attendance at regional, national, or international conferences." In nearly all instances the results were attributed to

the differences in current hours, preferred hours, and the preference gap between those adults with a four-year or graduate degree when compared with those with only a high school education or some college. Those with increasing levels of education spent more time on each educational activity and preferred to spend more time on each activity then those with only a high school or some college education.

For the occupation category, the areas yielding significant differences included "reading professional/educational literature," "in-house staff development/training programs," "use of company or local library," and "attendance at regional, national, or international conferences." In nearly all instances, the results were attributed to the differences in current hours, preferred hours, and preference gap between those adults employed in supervisory/management and professional positions when compared with those adults employed in clerical/support and manufacturing/processing jobs. Those adults working in supervisory/management and professional occupations spent more time and would prefer to spend more time on each educational activity than those in clerical/support and manufacturing/processing jobs.

For example, the current and preferred number of hours expended for the activity "reading professional and educational literature," as well as the difference between them increased by education level (P=.000, all three tests). These findings are illustrated in Figure 2.

Figure 2. Time devoted to reading by education level.



Research Question 3. Is there a significant difference in the comfort level of adult workers regarding the amount of time dedicated to self-directed, work-related learning while at work when examined by education level and occupation category?

The participants were asked to indicate their level of comfort if individuals of increasingly higher occupational status entered their workspace while they were reading a professional journal, newsletter, or textbook. The individuals listed as entering the respondent's workspace were "a peer at work," "someone who reports to you (list 'NA' if not applicable)," "your immediate supervisor," and "a top-level executive." Of the total sample, 613 adults responded to all four categories, and 1000 employees responded to the all but the category "Someone who reports to you." They used the following scale to answer this question:

1 = feel comfortable about spending work time in this manner.
2 = have mixed feelings about spending work time in this manner.
3 = feel uncomfortable about spending work time in this manner.
4 = feel like I was doing work best done on my own time.

Using the Friedman nonparametric test, significant differences were found in the ratings of the four categories of individuals who hypothetically entered the respondent's workspace (P=.000). The individuals became

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increasingly less comfortable dedicating work time to learning as individuals with increasingly higher levels of occupational status entered their workspace (see Westbrook and Veale, 2001a).

When examined by education level, one significant difference was found in the area "someone who reports to you" (P=.018). In this instance the adults with only a high school education were more uncomfortable spending time on work-related learning activities than those with a graduate degree.

When viewed by occupation category, significant results were obtained. Upon inspection, the major differences occurred when those employed in manufacturing/processing occupations were compared with those in supervisory/management and professional categories. In each instance, the adults employed in manufacturing/ processing occupations indicated they were more uncomfortable reading a journal, newsletter, or textbook when a "peer," "someone who reports to you," "your immediate supervisor," or a "top level executive" entered their workspace.

Research Question 4. Is there a significant difference in the awareness of adult workers regarding various organizational policies that support work-related learning when examined by education level and occupation category?

Several questions were asked related to the adults' awareness and use of various work related organizational policies. First, the respondents were asked if the need for work-related learning was expressed within key corporate communications such as the mission or vision statement. The answer were "yes," "no," and "I don't know." Fewer than half responded affirmatively to this question. In fact, almost a quarter of the respondents did not know if the need for work-related learning was stated within company communications. No significant difference was attributed to the education level of the adults. In contrast, a significant difference was obtained when viewed by occupation category (P=.000). Upon inspection, the difference was attributed to the relatively large number of clerical/support workers and the relatively small number of supervisory/management personnel who indicated that they did not know if the need for work-related learning was expressed in such corporate communications.

Second, the adults were asked if their employer had explained the availability of work-related education and development benefits or educational opportunities available at their place of employment. Over 80% or the respondents indicated that they were informed of such benefits or educational opportunities. When viewed by education level, a significant difference was found (P=.032) and was attributed to the relatively large number of adults with only a high school education who answered that they did not know about such benefits or opportunities. Likewise, when viewed by occupation category, a significant difference (P=.004) was found and was attributed to the relatively large number of adults in the manufacturing/processing category who indicated they did not know if such benefits had been communicated.

Third, the vast majority of respondents (83.9%) indicated that their employer had a defined amount of funds or a tuition reimbursement policy that they could use to attend work-related learning activities. When viewed by education level, a significant difference was found (P=.003) and was attributed to the relatively large number of adults with only a high school education who answered that they did not know about such funds or policies. Likewise, when viewed by occupation category, a significant difference was found (P=.000) and was attributed to the relatively large number of adults in the manufacturing/processing category who indicated they did not know of such funds or policies.

In general, the respondents with only a high school diploma and those employed in clerical/support and manufacturing/processing occupations seemed much less aware of the work-related learning policies and benefits when compared with the others. These respondents were significantly more likely to indicate, "I don't know" if work-related learning policies and benefits were communicated to them or if their employer had budgeted funds for their use. It is important to note that 70.4% of the adults employed in clerical/support and manufacturing/processing occupations had only a high school education.

Discussion

The purpose of this research was to examine if evidence of a knowledge divide existed in the self-reported work-related learning patterns and attitudes of 1,031 working adults in Iowa. An author-constructed survey served as the basis of an optional graduate research project that involved 73 part-time graduate students between 1996 and 1998. The data were examined by investigating the possible influence of the adults' educational level and occupation category on the responses to the survey questions.

To date, few research studies have investigated the level to which adults indicate they place learning as a priority or core value in their lives, or the extent to which organizational factors enhance or inhibit individual

learning (Merriam & Caffarella, 1999; Gallup Organization, 1998). Thus, this research was helpful in providing a descriptive measure of adults' attitudes about individual and organizational factors impacting their level of learning.

The results of this study support the existence of a knowledge divide in our organizations. This divide is related to the adult's education level and occupation category. The divide by education level occurred between those with only a high school education or some college compared to those with a four-year or graduate degree. The divide by occupation level occurred between those individuals employed in clerical/support or manufacturing/ processing jobs as compared to those adults working in supervisory/management or professional occupations.

In comparison to adults with a four-year or graduate degree, those with only a high school education or some college spend less time in work-related learning activities, prefer to spend less time in work-related learning activities, and are considerably less aware of organizational policies related to work-related learning benefits. These results are indicative of the knowledge divide referenced by Davis and Botkin (1994).

This research calls into question the premise of a learning organization where all employees continually learn. Senge (1990) described the learning organization as a place "where people continually expand their capacity to create results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together" (p. 3). Thompson (1995) stated, "A company's ability to learn and innovate is a direct driver of the company's capability to increase revenues, profits, and economic value" (p. 85). This study suggests that the learning organization may exist only for those with the highest levels of education working in higher status occupations. If true, there seems to be a disconnect between what is advocated as necessary for learning organizations and the actual state of learning in some, and perhaps most, corporations (see Westbrook and Veale, 2001a).

Specifically, the conclusions from this study suggest the following:

1. Differences in current and preferred learning patterns exist across education levels and occupation categories.
2. Differences in the awareness of organizational work-related learning policies and benefits exist across education levels and occupation categories.
3. Employees in the manufacturing/processing occupations are the least comfortable spending time in self-directed work-related learning.
4. Employees with only a high school education or some college seem the most at-risk of becoming the knowledge have-nots in our society.

The results of this study may be helpful to professionals within the human resource development field as they provide an opportunity to examine the specific learning culture within organizations and the extent to which a knowledge divide exists in various corporations. Using the instrument of this study, an organizational audit of current and preferred levels of work-related learning as well as awareness of organizational policies that advance learning could be conducted and would be helpful to assess an organization's learning culture.

For those involved in academic research, this study advances our understanding of the extent to which learning serves as a core value for most adults and the organizations in which they are employed. It would be of interest to determine whether the apparent knowledge divide is the intended or unintended consequence of the practices of most organizations. Such research would shed light on the extent to which the tenants of the learning organization are actually practiced within most organizations.

Limitations to the Research

The sample of this study was comprised of adults employed full-time in Iowa. The sample of the study was derived from volunteers enrolled in a graduate degree program who surveyed employees at their place of employment. The sample, while large, is not random. Thus, there is no assurance that the sample is representative of the population of adults working in organizations in Iowa.

Recommendations for Further Research

This study should be viewed as an initial step in determining the existence of a knowledge divide in our organizations. The results provide encouragement for additional research on the work-related learning preferences and attitudes of adults. A national, statewide, or organization-wide study using a random sample would be a good next step in identifying the work-related attitudes of adults and the extent to which the knowledge divide is a reality in our society.

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